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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,782	10/31/2003	Rex K. Frost	10559-863001	1688

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MINNEAPOLIS, MN 55440-1022

EXAMINER

ROSASCO, STEPHEN D

ART UNIT	PAPER NUMBER
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1756

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/28/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/698,782

Applicant(s)

FROST ET AL.

Examiner

Stephen Rosasco

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 27-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Detailed Action

In response to the Amendment of 1/29/07 the examiner withdraws the prior office action rejections and includes new rejections here over newly cited art.

Remarks – the applicant is using the technique of pre-distortion for features whose separation distance can be increased enough to eliminate pattern distortion near feature edges but not change the pitch of the feature.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 4, 10 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Hada (6,200,710).

Hada teaches in claims 7-10, the method which comprises imparting a correction selected from the group consisting of reticle feature resizing, and predistortion processing.

And wherein the predistortion process anticipates pattern-feature distortion due to an optical system that performs the microlithographic exposure and includes distorting reticle pattern-feature data.

And wherein the predistortion processing comprises altering a characteristic of a reticle subfield based on an anticipated manufacturing stress distortion of the reticle so as to cancel the manufacturing stress distortion.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hada (6,200,710) in view of Shi et al. (6,792,591).

The claimed invention is directed to a method for accommodating diffraction in the printing of features on a substrate. The method includes identifying a pair of features to be printed using a corresponding pair of patterning elements and increasing a separation distance between the pair of patterning elements while maintaining the sufficiently small pitch between the corresponding imaged features.

Hada teaches in claims 7-10, the method which comprises imparting a correction selected from the group consisting of reticle feature resizing, and predistortion processing.

And wherein the predistortion process anticipates pattern-feature distortion due to an optical system that performs the microlithographic exposure and includes distorting reticle pattern-feature data.

And wherein the predistortion processing comprises altering a characteristic of a reticle subfield based on an anticipated manufacturing stress distortion of the reticle so as to cancel the manufacturing stress distortion.

The teachings of Hada differ from those of the applicant in that the applicant teaches specific relative orientations of the features such as parallel and perpendicular.

Shi et al. teach (see claims 8 and 10) a method of designing a mask pattern for transferring a lithographic pattern onto a substrate by use of a lithographic apparatus with a desired illumination scheme, said method comprising: identifying extreme interaction pitch regions and corresponding undesirable illumination angles; and designing said mask pattern by arranging features such that no combination of features in said mask pattern has a pitch in an extreme interaction pitch region for which illumination angles in said desired illumination scheme are undesirable.

Therefore, Shi et al. amply teach how to design the mask to deal with the diffraction limitations of adjacent features of small pitch for any feature orientations.

It would have been obvious to one having ordinary skill in the art to take the teachings of Hada and combine them with the teachings of Shi et al. in order to make the claimed invention because it would have been obvious to adjust a mask

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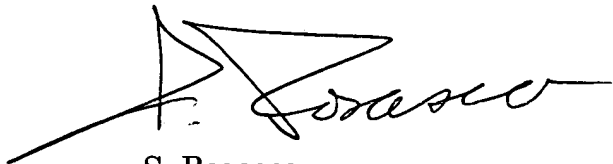
design to use the situations where distortion is known to occur for an intentional result.

Applicant's arguments with respect to claims 1-26 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Stephen Rosasco whose telephone number is (571) 272-1389. The Examiner can normally be reached Monday-Friday, from 8:00 AM to 4:30 PM. The Examiner's supervisor, Mark Huff, can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in dark ink, appearing to read 'S. Rosasco', with a stylized, sweeping flourish extending from the end of the name.

S. Rosasco
Primary Examiner
Art Unit 1756

S. Rosasco
3/26/07